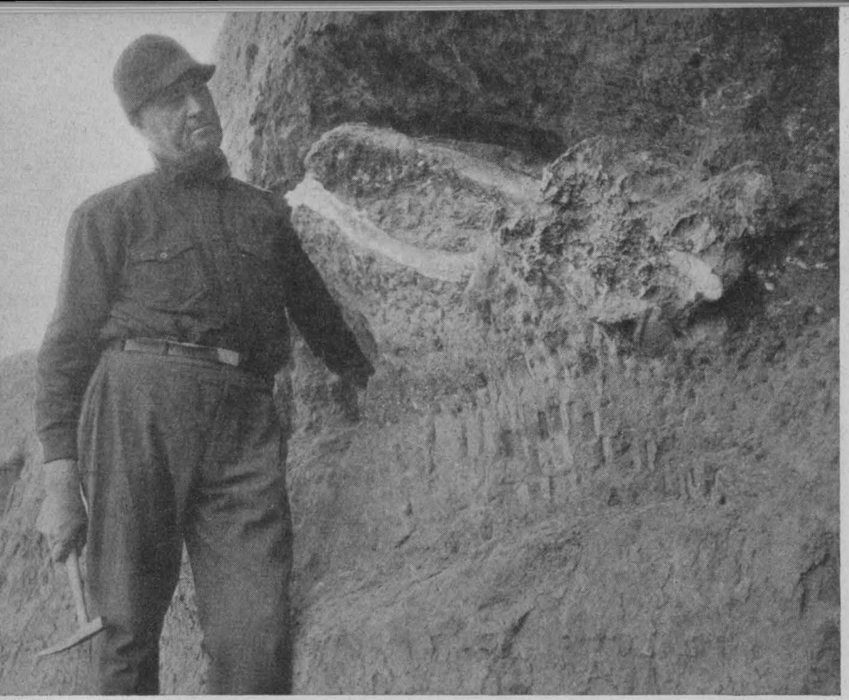
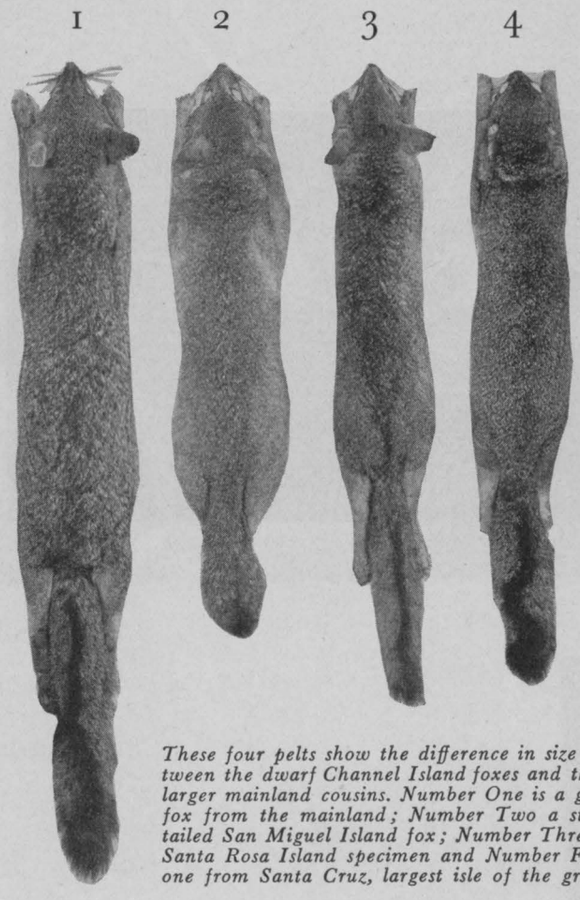


A scientist, patiently chipping away at a bone prospect, has brought to light the rest of the skull of a Channel Island elephant; the lower jaw of the long-dead animal is completely preserved beneath the skull

ICE AGE *Elephants* OF THE CHANNEL ISLANDS

By CHESTER STOCK

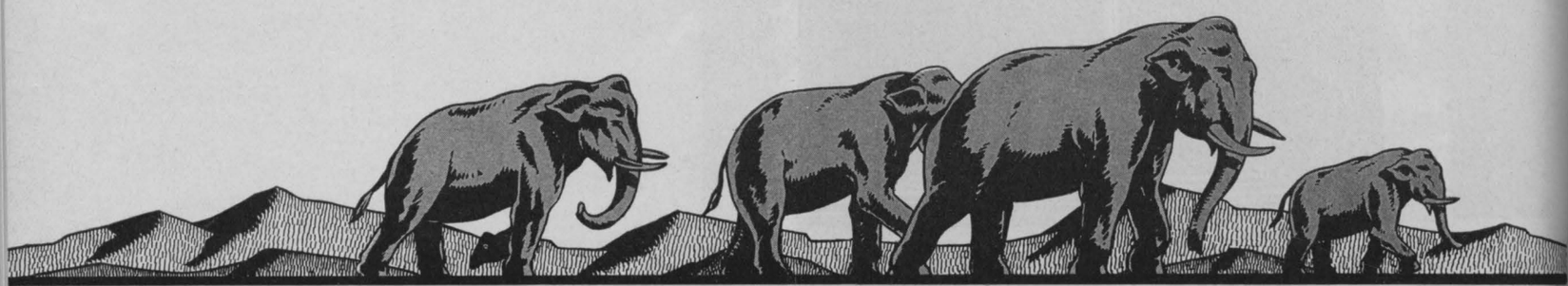


These four pelts show the difference in size between the dwarf Channel Island foxes and their larger mainland cousins. Number One is a gray fox from the mainland; Number Two a stub-tailed San Miguel Island fox; Number Three a Santa Rosa Island specimen and Number Four one from Santa Cruz, largest isle of the group

Of the small company of land mammals native to the Channel Islands of Southern California none reaches large size, and, if we exclude aboriginal man and his dog, the largest is the fox. This interesting creature, once more numerous than it now is, exists under a variety of conditions on the several islands and may be seen occasionally searching for food along the seashore or living in cactus patches, brushy ravines, and on the open slopes of hills to an elevation of more than 2,000 feet. It seems to lead at present a solitary life. The island species was long ago recognized by biologists as a distinctive type, related to the mainland gray fox rather than to the kit fox and red fox. Six races have now been identified, one for each of the principal islands comprising the Channel Island group.

One peculiar feature of these island foxes is their small size. Adult animals, when compared with similar forms representing the California gray fox of the mainland, are seen to be distinctly smaller. Their presence on these islands is likewise of interest, for, unless we assume that they were introduced by early man, which is extremely unlikely, the only satisfactory explanation of their presence implies a distribution in this region at some former time when the islands formed parts of more extensive land areas connected with the mainland. Indeed, geologic investigations tell us that as late as the Ice Age, possibly 25,000 to 100,000 years ago, important earth changes occurred in this region and the distribution of land and sea was noticeably different from that which prevails here today.

If the foxes reached the land areas now comprising the islands during some stage of the Ice Age, it might be assumed that with lapse of time their small size and other distinctive features were acquired through gradual adjustment to life under circumstances of restricted land area and environment, with pos-

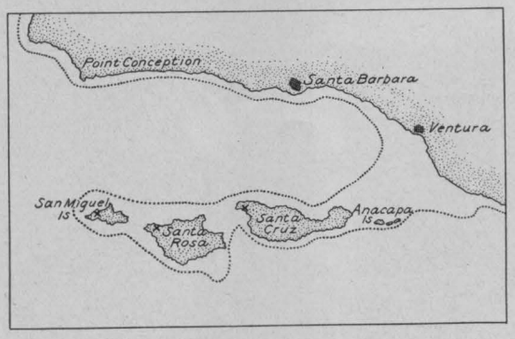


sibly inbreeding also playing a part, all brought about by island isolation. On the other hand small species of the gray fox group are known to live now in Southern Mexico and Central America, and it is possible that the island forms were derived from this stock at a geologically earlier time, perhaps during an interglacial stage, when forbears of these types enjoyed a more northerly distribution. In this light the island forms are to be looked upon now as stranded relics. Discovery of fossil evidence of the existence of foxes during the Ice Age in the island area would be of considerable importance in solving the problem. So far, however, no remains of ancient foxes have been found.

That mammals of comparatively large size grow smaller when isolated for a span of geological time under island conditions has been accepted by at least one school of biologic thought and a classic example often cited in support of this view is that furnished by the fossil or subfossil dwarfed elephants, no taller than 3 to 5 feet, found on the Island of Malta in the Mediterranean Sea just south of Sicily.

A somewhat similar example is now on record for the three northerly members of the Channel Islands. The discovery of fossil elephants belonging to the Ice Age on Santa Cruz, Santa Rosa and San Miguel sheds welcome light on this problem of isolation of animals on the Channel Islands and on the history of the coastal province of Southern California.

The picture above, taken from a point above a scientific bone-hunting camp, shows the typical cliff exposures of deposits in which Ice Age elephant remains are found on Santa Rosa Island



The dotted line on the map shows the coast line as it may have been in the age when the Channel Islands formed a peninsula extending into the Pacific

Fossil elephant hunts have been conducted by the California Institute of Technology on the Channel Islands and although no complete animal has been bagged, the collections obtained, particularly on Santa Rosa Island, include parts of skulls, jaws, teeth and skeletal elements. The fossil specimens occur frequently in alluvial deposits and terrace accumulations and are found at the present time in sea-cliff sections and in banks along the cañadas where they have been partially uncovered or exposed by the weathering away or erosion of sedimentary materials in which they were originally entombed. Elsewhere, shifting sand-dunes, through the action of the wind, sometimes reveal specimens on the surface of the ground.

Individuals of all ages are represented by these fossil materials. One of the unique specimens is a lower jaw that evidently belonged to an unborn animal.

When comparisons are made between adult island forms and mainland types of mammoths of the Ice Age one is struck immediately by a difference in size. Thus in contrast to the Columbian Mammoth, or to the Emperor Mammoth which occurs in the tar beds of Rancho La Brea and reaches a shoulder height of 11½ to 13½ feet, these island elephants presumably never exceeded 8 or 9 feet and smaller individuals were probably no taller than 6 feet.

Living elephants do not swim out to sea and cross marine barriers and there is no reason for believing that the mammoths of the Ice Age possessed different habits. On the other hand, it appears much more reasonable to assume a former continuous land surface, extending westward from the mainland to include the island areas, over which these animals ranged during the Ice Age. As a matter of fact, geologists are strongly of the opinion that the islands of San Miguel, Santa Rosa, Santa Cruz and Anacapa were in the past an integral part of a peninsula which continued in a westerly direction, the land area comprising the Santa Monica Mountains and adjacent regions.

With breaking up of the land area, herds of elephants that had wandered out on this ancient peninsula were forced into island exile. How long they survived under the limited environmental conditions imposed by restricted terrain, we have as yet no means of knowing, but they seem to have lingered long enough to grow small in stature. Whether or not the island elephants offer thereby a case parallel to that of the foxes cannot be definitely stated. History need not necessarily repeat itself in the animal kingdom. It remains altogether possible that the small size of the island foxes, in contrast to that of the Ice Age elephants, was a racial character in the possession of these forms long prior to their isolation. In either case, unlike the foxes, extinction was the fate of the elephants.

Eons ago the sea broke a peninsula up into islands; and a proud race, thus marooned, dwindled and died out